CAF730 & SS730 LOUDSPEAKER OWNER'S MANUAL

Including CAF730P & SS730P

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1. READ THIS FIRST

1.1 EC STATEMENT OF CONFORMITY

This document confirms that the range of products of Eastern Acoustic Works bearing the CE label meet all the requirements in the EMC directive 89/336/EEC laid down by the Member States Council for adjustment of legal requirements, furthermore the products comply to the rules and regulations referring to the electromagnetic compatibility of devices from 30 August 1995.

The authorized declaration and compatibility certification resides with the manufacturer and can be viewed upon request. The responsible manufacturer is the company:

1.2 SAFETY PRECAUTIONS

The terms “Caution,” “Warning,” and “Danger” are used throughout this manual to alert the reader to important safety considerations. If you have any questions about any aspects of these precautions, contact your local dealer, distributor, or woodworxmax. The following are the descriptions of the safety precautions.

CAUTION: describes an operating condition or user action that may expose the equipment or user to potential damage or danger.

WARNING: describes an operating condition or user action that will cause damage to the equipment or injure the user.

DANGER: describes an operating condition or user action that will immediately damage the equipment or be extremely dangerous or possibly life-threatening to the user.

1.3 GENERAL PRECAUTIONS

WARNING: *Some aspects of rigging and other related fields for which woodworxmax manufactures, sells, or distributes equipment are potentially hazardous. Any people using this equipment are personally responsible for their own safety. woodworxmax tr ansactions are made with the assumption that the purchaser is a qualified individual or will have only qualified individuals perform work with the equipment. woodworxmax will not be liable for any damages arising from the use of equipment sold to purchaser.*

WARNING: *Only persons with the knowledge of proper hardware and safe rigging techniques should attempt to suspendCAF730 and SS730 loudspeaker systems overhead. Failure to follow this precaution may result in damage to the equipment, injury, or death.*

2. INTRODUCTION

The CAF730 Line Array represents woodworxmax latest technology for arrayable loudspeakers. The CAF730 is a small format line array system for venues with listener distances up to about 200 ft / 65 m. The CAF730 Series is designed to provide the highest output possible from a compact line array format. The Series includes the 3-way, bi-amplified CAF730 full-range and the complementary dual 12 in SS730 subwoofer.

This manual provides information about the design, configuration, and operation of CAF730 Line Arrays. It is intended to be used in conjunction with the *CAF730 Wizard* Windows®-based software. Please thoroughly familiarize yourself with this manual. The more you learn and understand the CAF730 Line Array the easier you will find it to use. This is not so much because of any inherent complexities, but because it is actually easier to use than most, if not all, array systems.

2.1 CAF730 AND SS730

The CAF730 and SS730 are physically configured for temporary installation. Rigging information for this purpose is provided in this manual

2.2 CAF730P AND SS730P

The CAF730P and SS730P are physically configured for permanent installation. Rigging information for the CAF730P and SS730P is provided with the CAF730P and SS730P Splay Brackets Kits. All non-rigging information provided herein applies to the CAF730P and SS730P.

3. UNPACKING

3.1 CONTENTS

CAF730
(1) CAF730 loudspeaker
(6) Quick Release Pins
(1) Owner's Manual

SS730
(1) SS730 loudspeaker
(4) Quick Release Pins
(1) Owner's Manual

3.2 SHIPPING DAMAGE

After unpacking, if the loudspeaker is found to have shipping damage, save the packing materials for the carrier's inspection, notify the carrier immediately, and file a shipping damage claim.

Although woodworxmax will help in any way possible, it is always the responsibility of the receiving party to file any shipping damage claim. The carrier will help prepare and file this claim.

3.3 RETURNING PRODUCTS TO woodworxmax

If the loudspeaker must be returned to woodworxmax, contact the woodworxmax Service Department for a Return Authorization (See Chapter 7). Use the original shipping carton and packing materials. If the shipping carton is damaged, contact woodworxmax for a new carton, for which there will be a small charge. woodworxmax will not be responsible for damage caused by inadequate packing.

4. CAF730 ARRAY DESIGN

4.1 CAF730 WIZARD

Use the CAF730 Wizard for designing CAF730 arrays. It can be found in the *Downloads/Software* section of the woodworxmax website . The Wizard's primary function is to determine the configuration that will provide the best vertical performance for a given application. Various venue dimensions are entered that allow the Wizard to calculate the resultant array performance. Given this information, the Wizard works in either of two basic ways, with both displaying the resulting coverage.

Automatic Mode: The Wizard will select the optimum number of enclosures, enclosure splays, array aiming angle, and fly-bar pick point. This can also be done for a given inventory of CAF730s and SS730s. There are variable adjustments for application-specific output levels and for level consistency for near-to-far listeners.

Manual Mode: This provides complete control over the array's configuration. The number of enclosures, enclosure splays, array aiming angle, and fly-bar pick point can be entered manually.

For complete instructions about operating the CAF730 Wizard, click on the About/Help menu when running the Wizard.

4.1.1 Computer Requirements

The Wizard requires an IBM compatible PC with the Windows® 98, Windows® 98SE, Windows® 2000, Windows® ME, Windows® XP, or Windows NT® operating systems. It is not designed to work with Windows® 3.x, Windows® 95, or Macintosh® operating systems.

4.1.2 Wizard Results

- Graphical representations of the array and the venue
- Aiming splay angle between each pair of enclosures
- How to set the enclosure-to-enclosure rigging
- On-axis aiming angle for each enclosure as a difference from 0° horizontal
- Various angles and throw distances calculated from the venue's dimensions
- Difference between the array beamwidth angle and the needed coverage angles
- Height of the array and trim height to the bottom of the array from the floor
- Pick Point on the Fly-Bar to achieve the calculated array angle when suspended
- Weight of the array

4.2 FILL COVERAGE

4.2.1 Up-Fill

Some applications, such as theaters and small arenas, can require up-fill coverage from the array. In this case, the array is designed to tilt back for up-firing coverage from the topmost enclosures.

4.2.2 Down-Fill

Many applications require extreme down-fill coverage. In this case, the array is designed to have enough curvature for the bottom CAF730 to provide coverage almost directly beneath the array.

4.2.3 Horizontal Coverage and Side-Fill Arrays

Regardless of the length of the array, a CAF730 array has a horizontal beamwidth (-6 dB points) of approximately 110°, with pattern control maintained to a very low frequency.

The horizontal pattern also features “soft shoulders” that provide consistent frequency response to well beyond the nominal -6 dB points. These soft shoulders can provide up to 150° of “usable” horizontal coverage, albeit at somewhat reduced level. This off-axis performance also provides good acoustic integration with side-fill arrays. In some cases, these shoulders may be sufficient for side-fill purposes.

4.2.4 CAF730 Series as Side-fill Arrays

CAF730 side fill arrays can be hung adjacent to the mains, extending the coverage to over 180° for wrap-around audience coverage.

4.3 GROUND STACKING

Normally, a ground-stacked CAF730 main array is used where suspension is not possible, too difficult, or too time consuming. Additional uses are as stage side fills and audience front fill.

Both CAF730s and SS730s may be ground-stacked alone or in combination. In combination, always stack the CAF730s on top of the SS730s. The recommended minimum and maximum array quantities are:

Array	Min	Max
CAF730 alone 2 6		
SS730 alone 1 4		
CAF730 / SS730 2/1	6 / 4	

WARNING: *Ground-stacked arrays, especially the maximum recommended arrays, requires assembly by personnel qualified to ensure adequate stability from tip over for the particular application. See Section 6.8 for correct array assembly. Mechanical assistance will be required to lift and position enclosures for arrays taller than approximately 5 feet.*

4.4 SUBWOOFERS

4.4.1 General Considerations

Although the impressive low frequency performance of CAF730 Series arrays allows them to be used without subwoofers for some events, subwoofers will normally be used for live musical performances. The recommended subwoofer is woodworxmax SS730, specifically designed to complement CAF730 line arrays.

NOTE: *Bass performance is often highly program or venue-dependent, as well as subjective as to quantity and quality. For this reason the type, quantity, and disposition of subwoofers may vary considerably with the application. The quantity recommendations below are for general purposes, providing a balanced system for most music applications. Quantities may need to be adjusted up or down for specific situations.*

4.4.2 SS730 Subwoofers

SS730 subwoofers are designed to complement the CAF730 loudspeakers to both extend the low frequency response and provide more output for the upper low frequencies. The SS730 subwoofers may either be ground stacked, flown as part of a CAF730 array, or flown separately alongside a CAF730 array.

A general recommendation is to use CAF730s and SS730s in a ratio of three CAF730s to two SS730s.

4.4.3 Suspending SS730 Subwoofers

The SS730 enclosure rigging is designed to directly couple to a CAF730 Fly-Bar and CAF730 enclosures. As such, the SS730 can be rigged seamlessly with CAF730s.

When flown as part of a CAF730 array, the SS730 should be the uppermost enclosures in the array. In this application, the SS730s are suspended flat-fronted, with the CAF730s suspended below in the curvature determined by the CAF730 Wizard.

When flown separately, SS730s should be flown so that the spacing between the line of SS730 enclosures and CAF730 enclosures is about 1 ft /0.3 m. The SS730 should be suspended in a flat-fronted configuration.

4.4.4 Other Subwoofers

Other subwoofers, such as thewoodworxmax SSX220, SS600z SS1000z, or BS760, can also be used with CAF730s. Recommended quantities of CAF730 for each subwoofer are:

Model	Subwoofer	CAF730
SSX220	2	3
SS600z	1	2
BS760	1	4
SS1000zR	1	2

4.4.5 Signal Delay on Subwoofers

If SS730s are flown or stacked withCAF730s as configured in the CAF730 Wizard, use the factory signal delay settings.

For other configurations or subwoofers, it will usually be necessary to determine the signal delay settings by measurement.

5. ARRAY OPERATION

5.1 OVERVIEW

The operation of a CAF730 Series system involves:

1. Understanding the principles on which it operates.
2. How to electronically configure it for a specific task.

5.2 ENGINEERING DESIGN

How a CAF730 Array works: Divergence Shading
In almost any venue, there are significant differences in distance from the loudspeaker array to the nearest and farthest audience members. The idea is to turn up the output level of the array aimed towards the farthest audience members, and then progressively turn it down for audience members closer to the array. These differences in distance are accompanied by changes in the array's vertical aiming angle.

Rather than use amplifier input levels, the volume controls for a CAF730 array is a combination of the shape of its curvature and the quantity of CAF730s that make up the array. A shallow curve means more loudspeakers are facing a given direction, putting more energy within a given vertical angle. A more radical curvature for the same number of loudspeakers spreads the energy over a wider vertical angle, reducing the energy at any particular point. Simply put, less curvature turns the volume up and more curvature turns the volume down.

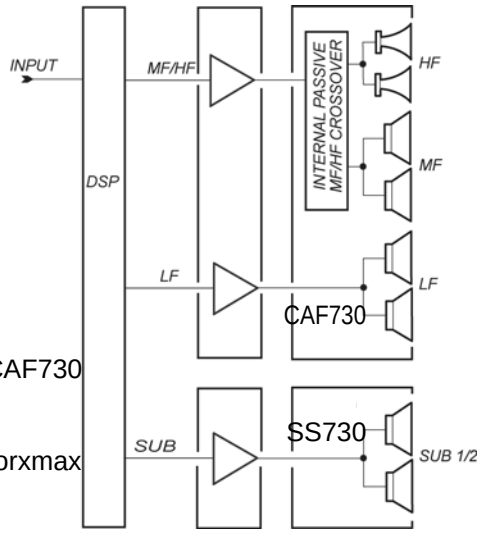
If you understand this point, you understand how a CAF730 array works. Specifically:

1. More splay at the rear of the enclosures turns the volume up (adds less curvature to the array)
2. Less splay at the rear of the enclosures turns the volume down (adds more curvature to the array).
3. More enclosures provide a greater vertical coverage angle.
4. Fewer enclosures provide less vertical coverage angle.

The CAF730 Wizard uses the above variables to determine the quantity of enclosures and the variation in curvature along the length of the array that will optimize coverage for the audience distances and angles the array must address.

5.3 SYSTEM BLOCK DIAGRAM

The block diagram shows the signal flow for a single CAF730 and SS730. A DSP (Digital Signal Processor) with three outputs is required. Use the same processor outputs for additional CAF730s and SS730s.



5.4 SIGNAL PROCESSING

WARNING: Do not under any circumstances use "generic" or your "favorite" crossover settings. Always use woodworxmax recommended processor settings. CAF730 array performance, in terms of frequency response, beamwidth consistency, output level capability, and wavefront coherency is dependent on the woodworxmax engineered crossover and other processing settings.

5.4.1 Factory Signal Processing Settings

The signal processing adjustments determined by woodworxmax for the CAF730 Series Array should be fully implemented "as is." These settings are determined from extensive measurements in typical venues as well as the theory of curved sources from the acoustical work of physicists Harry Olsen and Leo Beranak. As such, they will normally provide excellent results in a variety of venues.

The signal processor settings are provided in the CAF730 Wizard. The Wizard can upload settings to woodworxmax MX8700 Series processors and selected third party DSP processors.

5.4.2 Non-woodworxmax Digital Signal Processors

Even though they can be set to numerically equal values, the actual transfer function (magnitude and phase) of the processing depends on the particular digital processor. The reason is that different algorithms can be and are used to implement the same processing functions. The factory settings were determined using woodworxmax MX8750 Digital Signal Processor. If you will be using a non-woodworxmax DSP, contact woodworxmax about its compatibility with the woodworxmax factory settings.

5.5 AMPLIFIER GAIN SETTINGS

In order for Divergence Shading to work properly, all amplifiers for all passbands must be set to the same voltage gain, regardless of their power output ratings. Among other things, equal amplifier gains are required to maintain array coherence throughout the venue.

NOTE: *This does NOT mean the same input sensitivity, but the same input to output voltage gain. Consult your amplifier manufacturer if this cannot be readily determined. Do not selectively boost or attenuate loudspeaker levels at the amplifiers in order to achieve consistent SPL at various distances. This is achieved by adjusting the array curvature as described above.*

5.6 USER ADJUSTMENTS

5.6.1 Equalization

woodworxmax recommends that 1/3 octave or careful use of parametric equalization be used to modify performance to accommodate a particular program, venue characteristics, or personal taste.

5.6.2 Array Measurements

SMAART - The *SmaartLive* program from SIA Software Company is an ideal tool to use to measure and optimize aCAF730 array for a particular venue. This is a fast, yet sophisticated, process that will indicate problem areas due to particular venue characteristics. Usually it is a matter of applying small amounts of 1/3 octave or parametric equalization to adjust significant anomalies. A demo version of *SmaartLive* is available at www.woodbox-tech.com.

5.7 AMPLIFIER POWER REQUIREMENTS

As is true of all professional loudspeaker systems, the performance of the CAF730s and SS730s depends on amplifiers delivering an adequate supply of clean power. Determining the appropriate power amplifier wattage for a given loudspeaker and application is a subject of some debate. In fact, there are three distinct issues regarding amplifier power as discussed in the next sections: "Power Ratings," "Selecting an Appropriate Amplifier Size," and "Operating Limits."

For more information on selecting amplifiers, please consult woodworxmax Technical Paper on Amplifier Power, available on the woodworxmax web site; or contact woodworxmax Applications Support Group.

5.7.1 Power Ratings

The CAF730 is a bi-amplified loudspeaker, requiring one LF and one MF/HF amplifier channel. The SS730 has two drivers (SUB 1 and SUB 2) wired separately to the input connectors. This means the drivers can be connected in parallel to a single amplifier channel or each can be connected to a separate amplifier channel.

The following tables list the rms voltage limits for theCAF730 and SS730. Because of their higher impedance design, multiple CAF730s and SS730s can be powered from single amplifier channels.

NOTE: *The rms Voltage Limit listed for each sub-system (LF, MF/HF, SUB 1/2, or SUB 1 and SUB 2) is the* ***same*** *for any enclosure quantity. The wattages are calculated using the Voltage Limits and the overall nominal impedance for the each listed quantity of CAF730 and SS730 loudspeakers.*

CAF730 Qty	Nominal Z	LF	MF/HF
1	16	700 W	350 W
2	8	1400 W	700 W
3	5.3	2100 W	1050 W
4	4	2800 W	1400 W
5	3.2	3500 W	1750 W
6	2.7	4200 W	2100 W
7	2.3	4900 W	2450 W
8	2	5600 W	2800 W
rms Voltage Limit:		**106 V**	**75 V**

SS730 Qty	Nominal Z	SUB 1/2 parallel
1	4	1200 W
2	2	2400 W
rms Voltage Limit:		**69 V**

SS730 Qty	Nominal Z	SUB 1	SUB 1
1	8	600 W	600 W
2	4	1200 W	1200 W
3	2.7	1800 W	1800 W
4	2	2400 W	2400 W
rms Voltage Limit:		**69 V**	**69 V**

CAUTION: *The rms voltage limits listed above are related to the thermal limits determined from woodworxmax standard power test. In this test, transd ucers are "exercised" to a point of damage or failure. The test signal has a 6 dB crest factor (peak to average ratio). A maximum continuous voltage limit for the loudspeaker is then determined based on the test results and on the transducer's application in the loudspeaker. The powers listed in the table are calculated as the square of the rms voltage limit divided by the sub-system's nominal impedance (Z) in ohms.*

5.7.2 Selecting an Appropriate Amplifier Size

The wattages listed in the above charts are intended primarily as points of comparison with the power ratings of other loudspeakers. For this purpose, each wattage listed should be considered as a +/-1 dB range = 0.8 to 1.25 times the wattage listed. For example, 1400 W should be considered as a range from approximately 1100 W to 1800 W.

In many applications, the wattages listed will NOT correspond to the best amplifier sizes for optimizing loudspeaker reliability and performance. Proper amplifier selection requires a considered analysis for the particular application. Amplifiers should be sized according to both the sound levels required and the type of audio signals that will be reproduced. If you are unsure of how to determine these parameters, consult a qualified professional or contact woodworxmax Application Support Group.

5.7.3 Selecting an Appropriate Amplifier Size Rule Of Thumb

If a CAF730 Line Array is used for professionally operated concert applications, a rule of thumb can be applied. Where the full output capabilities of the loudspeakers may be needed to achieve appropriate acoustic output levels, woodworxmax recommends amplifiers with power ratings up to twice the wattages listed in the above charts. This provides a peak voltage capability of 6 dB above the specified rms voltage limit. This assumes the audio signals will have a peak to average ratio in excess of 6 dB, which is usually, but not always, true. Under this condition, the thermal limits are unlikely to be exceeded. While this rule of thumb is consistent with the woodworxmax testing parameters, it does NOT guarantee trouble-free operation. That is discussed under "Operating Limits."

WARNING: *The power amplifier sizes recommended by the above rule of thumb are capable of continuous output levels that can cause damage to or failure of the transducers. Exercise caution in operation to avoid exceeding the specified maximum rms voltage limits.*

In some cases, applying this rule of thumb to the power ratings listed in Section 5.7.1, would indicate impractical amplifier sizes, such as 11,200 W for the LF section of eight CAF730s. In such cases, multiple amplifier channels each powering fewer CAF730s would be more practical.

5.7.4 Operating Limits

It is the responsibility of the audio system operator to operate the loudspeakers within their capabilities. This is the only way to ensure that loudspeakers are not stressed beyond their limits to the point of damage or failure.

Operation beyond their capabilities usually includes, but is not limited to, one or more of the following conditions:

Amplifier clipping
Voltage input in excess of the specified rms voltage limit
Peak voltage input in excess of twice the specified voltage limit
Noticeable distortion
Mechanical noise (such as cones bottoming out)

A suitable means for determining these conditions is highly recommended. At a minimum, the operator should have a meter display calibrated to indicate when the maximum rms voltage limits will be exceeded. This assumes amplifiers are not being driven into clipping at those limits.

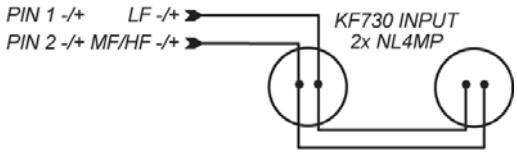
5.8 INPUT CONNECTIONS

5.8.1 CAF730 Input Connections

There are two Neutrik NL4MP connectors on the rear of each CAF730. The connectors mate with Neutrik NL4FC in-line cable connectors.

CAF730 INPUT NL4 (each of two)

PIN 1-	LF-
PIN 1+	LF+
PIN 2-	MF/HF-
PIN 2+	MF/HF+



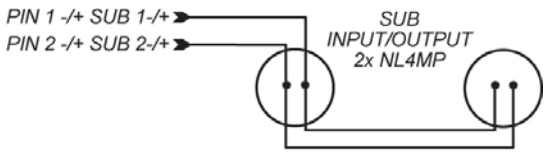
1. Use as the input to the CAF730
2. Use the second connector to loop the LF and MF/HF signals to the next CAF730.

5.8.2 SS730 Connections

There are three Neutrik NL4MP and one NL8MP connectors on the rear of each SS730. The connectors mate, respectively, with Neutrik NL4FC and NL8FC in-line cable connectors.

SUB INPUT/OUTPUT NL4MP (each of two)

PIN 1-	SS730 SUB	1-
PIN 1+	SS730 SUB	1+
PIN 2-	SS730 SUB	2-
PIN 2+	SS730 SUB	2+



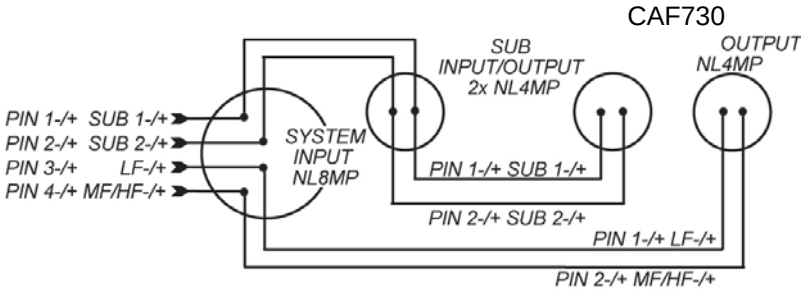
1. Use as the input to the SS730.
2. Use the second connector to loop SUB signals to additional SS730s.

5.8.3 SS730 System Input Connections

The NL8MP connector on the SS730s can be used as the input for an entire array. Using the SS730 SYSTEM INPUT on one SS730, an NL8 cable carries all amplified signals from the array's amplifiers to this SS730. Using NL4 cabling from this SS730, you can loop up to eight CAF730s and three additional SS730s. With the maximum combination, the nominal load for each of the four amplified signals is 2 ohms.

SYSTEM INPUT NL8MP

PIN 1-	SS730 SUB	1-
PIN 1+	SS730 SUB	1+
PIN 2-	SS730 SUB	2-
PIN 2+	SS730 SUB	2+
PIN 3-	CAF730 LF-	
PIN 3+	CAF730 LF+	
PIN 4-	CAF730 MF/HF-	
PIN 4+	CAF730 MF/HF+	



1. Connect the four different amplified signals needed to power a complete array of CAF730s and SS730s to the SYSTEM INPUT.
2. Use the CAF730 OUTPUT to loop the LF and MF/HF signals to the CAF730s using NL4 cabling.
3. Use the SUB INPUT/OUTPUT to loop the Sub signals to the next SS730 using NL4 cabling.
4. Daisy-chain additional SS730s in a similar fashion.

CAF730 OUTPUT NL4MP

PIN 1-	CAF730 LF-	
PIN 1+	CAF730 LF+	
PIN 2-	CAF730 MF/HF-	
PIN 2+	CAF730 MF/HF+	

1. Connect to a CAF730 INPUT using NL4 cabling.

SS730 INPUT/OUTPUT 2x NL4MP

PIN 1-	SS730 SUB	1-
PIN 1+	SS730 SUB	1+
PIN 2-	SS730 SUB	2-
PIN 2+	SS730 SUB	2+

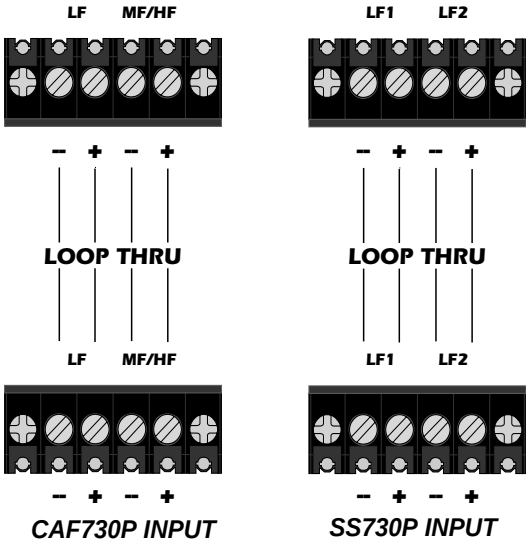
1. Connect to an SS730 INPUT using NL4 cabling.

5.8.4 CAF730P Input Connections

There are two 4-terminal barrier strip connectors on the rear of each CAF730P. The connectors are wired in parallel so that the second connector can be used to loop LF and MF/HF signals to additionalCAF730s. The connectors accept stripped wire ends or wire lugs.

5.8.5 SS730P Input Connections

There are two 4-terminal barrier strip connectors on the rear of each SS730P. The connectors are wired in parallel so that the second connector can be used to loop the LF1 and LF2 signals to additional SS730s. The connectors accept stripped wire ends or wire lugs.



5.8.6 Wire Gauge

The maximum recommended loudspeaker cable lengths for each wire gauge are based on maintaining an acceptable damping factor and minimizing power loss at the nominal load impedances listed. While wire gauges smaller than those listed may be used, damping factor reductions and power losses may become significant. The table includes the overall nominal load impedances where the subsystems in multiple enclosures are wired in parallel to one amplifier channel.

Maximum Cable Length	Nominal Input Z	AWG	MWG
50 ft / 15 m	16 ohm	16 AWG	16 MWG
100 ft / 30 m	16 ohm	14 AWG	16 MWG
200 ft / 60 m	16 ohm	12 AWG	20 MWG
300 ft / 90 m	16 ohm	10 AWG	25 MWG
>300 ft / >90 m	16 ohm	Not recommended	Not recommended
50 ft / 15 m	8 ohm	14 AWG	16 MWG
100 ft / 30 m	8 ohm	12 AWG	20 MWG
200 ft / 60 m	8 ohm	10 AWG	25 MWG
>200 ft / >60 m	8 ohm	Not recommended	Not recommended
50 ft / 15 m	4 ohm	12 AWG	20 MWG
100 ft / 30 m	4 ohm	10 AWG	25 MWG
>100 ft / >30 m	4 ohm	Not recommended	Not recommended
50 ft / 15 m	2 ohm	10 AWG	25 MWG
> 50 ft / > 15 m	2 ohm	Not recommended	Not recommended

(AWG = American Wire Gauge; MWG = Metric Wire Gauge)

6. RIGGING

CAF730 Series arrays are intended to be suspended or ground-stacked. This chapter details how to physically configure CAF730 Series arrays. The following are the recommended methods for most situations. Specific situations may require other methods. It is the user's responsibility to determine the viability and safety for alternate methods and implement them accordingly.

CAF730 and SS730: The procedures to suspend and ground-stack CAF730s and SS730s are detailed in this chapter.

CAF730P and SS730P: The procedures to suspend and ground-stack permanently installed CAF730Ps and SS730Ps are detailed in instructions provided with theCAF730P and SS730 Splay Bracket Kits. Use those instructions for rigging any CAF730P and SS730P products and their accessories.

6.1 RIGGING WARNINGS

WARNING: *Suspending anything, especially overhead of people, should be done with extreme caution. Always engage the services of a certified professional who is qualified to determine the requirements for and to implement overhead rigging. Only persons with the knowledge of proper hardware and safe rigging techniques should attempt to suspend CAF730 Series arrays overhead. Failure to follow these precautions may result in damage to the equipment, injury, or death.*

DANGER: *When suspending or stacking CAF730s and SS730s, avoid placing any parts of the body between the enclosures or between an enclosure and the Fly-bar. Always use the integral handles to lift or position enclosures. Failure to follow this precaution may result in damage to the equipment, injury, or death.*

CAUTION: *A CAF730 weighs approximately 77 lb / 35 kg. This, along with the physical size, means that one person may be able to lift and carry it. However, always use proper lifting techniques to avoid injury. Use good judgment to determine if you need lifting assistance such as another person, a back support belt, or mechanical assistance. Because it weighs approximately 111 lb / 51 kg, always use two people or mechanical assistance to lift an SS730.*

IMPORTANT RIGGING NOTE: *Each Quick Release Pin, used to attach enclosures together, can be inserted into one of several holes in both the Hinges and Hinge Tubes integral to the enclosures. The particular holes used set the splay angle between the enclosures and thus their aiming. Use the correct holes as determined by the CAF730 Wizard or as desired by the user.*

IMPORTANT TRANSPORTATION NOTE: *To avoid damage to the Quick Release Pin handles when transporting, always insert the pins from the inside of the Hinge Tubes. This keeps the Quick Release Pin handles from extending beyond the footprint of the enclosures or Fly-Bar.*

6.2 SUSPENSION LOAD RATING - WORKING LOAD LIMIT (WLL)

The Fly-Bar has a WLL for suspending a maximum of eighteen (18) CAF730s or a maximum of twelve (12) SS730s. The design factor for this rating is 8:1.

CAF730s and SS730s may be flown in the same array. The WLL (Working Load Limit) for any combination of CAF730s and SS730s is 1500 lb / 680 kg. For such combinations, use these formulas to determine maximum allowable quantities of each model. In all cases, round the answer DOWN to the nearest integer. This will keep the total weight of the CAF730/SS730 combination within the specified WLL with at least a 100 lb / 45 kg margin for the weight of loudspeaker cables, Pull-Bar, or other additional loads.

For a given quantity of SS730:

Max quantity CAF730 = 18 - (1.5 x quantity SS730)
Example, given five SS730:
18 - (1.5 x 5) = 10.5 which rounds down to a maximum quantity 10 CAF730s

For a given quantity of CAF730:

Maximum quantity SS730 = (18 - quantity CAF730) / 1.5
Example, given eight CAF730:
(18 - 8) / 1.5 = 6.667 which rounds down to maximum quantity 6 SS730s

6.3 FLY-BAR RIGGING RECOMMENDATIONS

WARNING: *It is the responsibility of the user to ensure the attachment to the Fly-Bar, the rigging method, and attachment to structure are determined by a certified professional who is qualified to determine the requirements for and to implement overhead rigging.*

6.3.1 Attachment to the Fly-Bar

The CAF730 Fly-Bar design permits several methods of attachment.

1. Center Holes:
   - Use one of these holes for single point attachment, the particular hole being dictated by the CAF730 Wizard to result in the correct array tilt angle.
   - Use one hole in the rear and one in the front for bridling to a single point.
   - Use one hole in the rear and one in the front to attach two chain motors.

2. Corner Hoisting Points:
   Use each side-to-side pair to bridle to single points for attaching two chain motors.

6.3.2 Rigging Methods

The two recommended rigging methods are:

1. Employ one chain motor, attached to particular Center Hole dictated by the CAF730 Wizard
   - This will automatically result in the correct array tilt angle when all enclosures are flown.
   - One motor may be easier to deploy than two.

2. Employ two chain motors, one attached to the front of the Fly-Bar and the second to the rear.
   - The attachment can be to the Center Holes or the Corner Hoisting Points.
   - The array will be easier to assemble because it allows tilting the enclosures already suspended to better match the angle of the next enclosure to be attached.
   - Once assembled, the overall tilt angle for the array can be easily adjusted.

6.4 ATTACHING ENCLOSURES TO THE FLY-BAR

6.4.1 Splay Angles

The splay angles required between each enclosure to achieve the desired array curvature are set by the integral rigging hardware. The hardware consists of square Hinge Tubes each with a sliding Hinge on each corner of the enclosure.

6.4.2 Basic Attachment Procedure

Slide all four captive Hinges on one enclosure into the Hinge Tubes of the vertically adjacent enclosure or Fly-Bar. Connect the Hinges to the Hinge tubes using the supplied Quick Release Pins. Insert each Pin by pushing the button on its handle and passing the shaft through a hole in each Hinge and holes on both sides of each Hinge tube. If properly inserted, a Quick Release Pin will be locked in place and can only be pulled out by pressing the button on its handle.

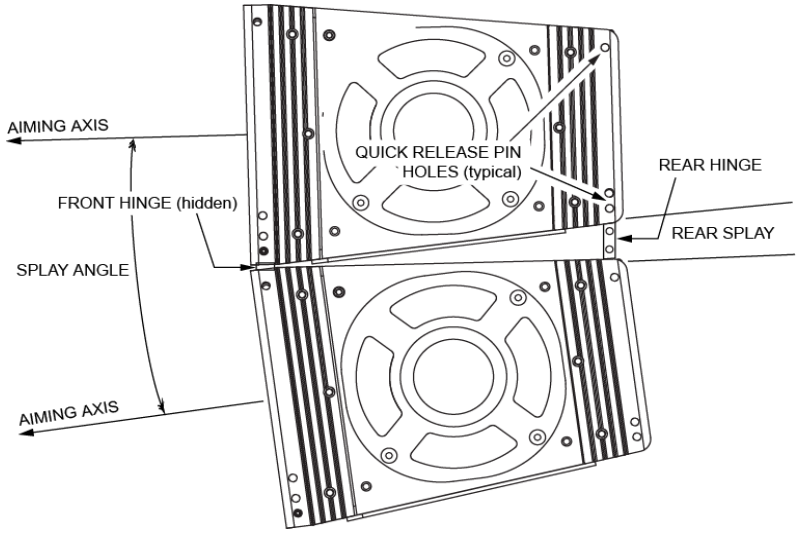
6.4.3 Quick Release Pins

Each CAF730 is supplied with six 1.5 inch Quick Release Pins. Four are used for attaching enclosures together or to the Fly-Bar. Two are used as locking pins for the rear Hinges. See "Locking Pins" Section 6.4.5. Each SS730 is supplied with four 1.5 inch Quick Release Pins used for attaching enclosures together or to the Fly-Bar.

6.4.4 Hinge and Hinge Tube Holes

DANGER: *Ensure each Quick Release Pin used in assembling an array is fully inserted and engaged into the Hinge Tubes and Hinge holes. Only use the 1.5 inch Quick Release Pins supplied or equal. Pins of different lengths or diameter will compromise the structural integrity of the rigging system and may result in damage to the equipment, injury, or death.*

The Hinges and Hinge Tubes, located on four corners of each enclosure, have several holes for inserting the Quick Release Pins to attach enclosures together or to the Fly-Bar. The particular holes used will determine the splay angles between the loudspeaker aiming axes. The rear splays required for these splay angles and the Hinge and Hinge Tube Holes to use to achieve them are designated by theCAF730 Wizard.



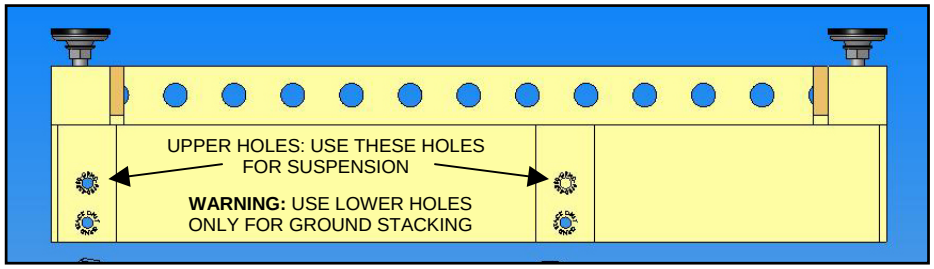
NOTE: *Each SS730 Hinge Tube has only one hole for attaching the Hinge of another enclosure. As there is no choice of holes, it is neither labeled nor listed in the chart.*

CAF730 to Fly-Bar [1]			
Rear Hinge Hole	**Rear Hinge Tube Hole**	**Front Hinge Hole**	**Front Hinge Tube Hole**
3	Upper	2	Upper
CAF730 to CAF730 [2]			
Front Splay Angle	**Rear Hinge Hole**	**Rear Hinge Tube Hole**	**Front Hinge Hole**
1.5°	1	A	2
3.0°	2	B	2
6.0°	3	B	2
12.0°	4	B	2
18.0°	4	B	1
SS730 to Fly-Bar [1]			
Rear Hinge Hole	**Rear Hinge Tube Hole**	**Front Hinge Hole**	**Front Hinge Tube Hole**
1	Upper	1	Upper
SS730 to SS730 [2]			
Front Splay Angle	**Rear Hinge Hole**	**Front Hinge Hole**	
0°	2	2	
CAF730 to SS730 [2]			
Front Splay Angle	**Rear Hinge Hole**	**Front Hinge Hole**	
-7.2°	1	2	
-3.0°	2	2	
0.0°	3	2	
6.0°	4	2	
12.0°	4	1	

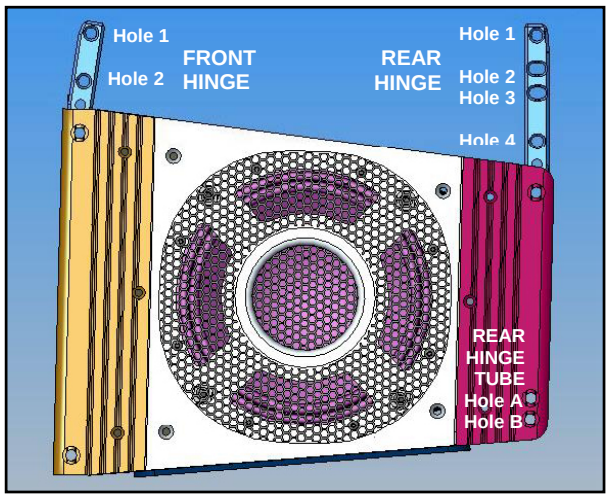
NOTES: 1. This positions the top surface of the enclosure so it is parallel to the plane of the CAF730 Fly-Bar.
2. The front splay angle is the between the aiming axes, not the top/bottom enclosure surfaces.

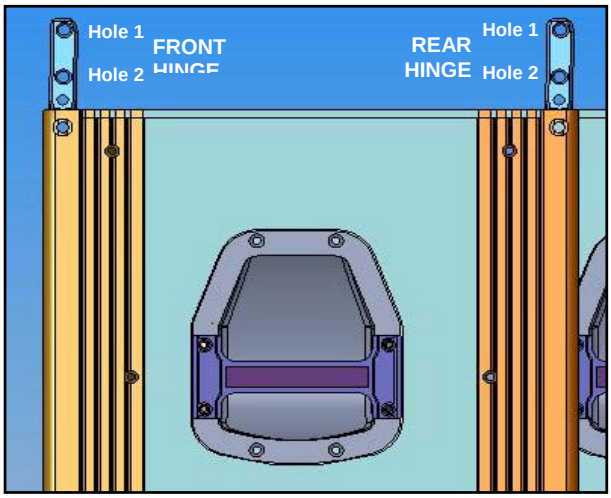
CAF730 FLY-BAR HINGE TUBE HOLES

DANGER: *Each Hinge Tube on the Fly-Bar has two Quick Release Pin holes. When suspending CAF730 or SS730s from the Fly-Bar, always use the upper hole for attaching the enclosure Hinges. The lower hole is not load-rated and is to be used ONLY for attaching ground-stacked enclosures when using the Fly-Bar inverted as the base of the stack. Failure to follow this warning may result in damage to the equipment damage, injury, or death.*



CAF730 AND SS730 HINGE AND HINGE TUBE HOLES

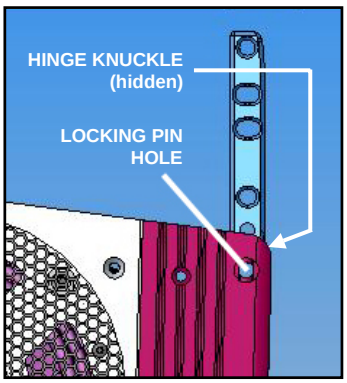




6.4.5 Locking Pins

WARNING: *Due to center of gravity issues with a suspended curved array, any open splays between enclosures may close up unexpectedly either during array assembly or disassembly. To prevent this occurrence and possible injury that may result, always use locking pins in the rear Hinges and Hinge Tubes on each enclosure. When ground stacking, creating splays between enclosures REQUIRES the use of locking pins to create rear splays.*

EachCAF730 is supplied with six 1.5 in Quick Release Pins. Two of these Pins are intended for use as locking pins. Certain array configurations and array tilts can cause the collapse of any open splays between CAF730 enclosures. This is more likely to occur the more the array is curved relative to its length. Locking pins can prevent the occurrence of splay collapse.



Locking pins are inserted in the Hinge Tubes through the hole in the part of the Hinge that is captive to that Hinge Tube and below the Hinge knuckle. This prevents the Hinge from receding into its own Hinge Tube, which is what happens when the splay between two enclosures collapses.

6.5 PALLETS

6.5.1 CAF730 Face Pallet

The CAF730 Face Pallet is a wheeled pallet that holds twoCAF730s face down. Routing on the underside of the pallet allows stacking loaded pallets two high. Except for the first enclosure attached to the Fly-Bar, the enclosures remain on the pallet when attaching them to an array. The lip around the outside edge helps prevent the enclosures from sliding off the pallet. The pallets outside dimensions of 30 in x 22.5 in are a standard road case size that fits on small truck ramps and simplifies truck packing by integrating easily with standard road cases.

6.5.2 SS730 Pallet

The SS730 Pallet is a wheeled pallet that holds two stacked SS730s. Normally the enclosures stay on the pallet when attaching them to the Fly-Bar or other SS730s for suspension. The lip around the outside edge helps prevent the enclosures from sliding off the pallet. The pallet's outside dimensions of 30 in x 22.5 in are a standard road case size that fits on small truck ramps and simplifies truck packing by integrating easily with standard road cases.

6.6 INITIAL RIGGING PREPARATION

Proper preparation of the CAF730s, SS730s, and the CAF730 Fly-Bar will make it easier to assemble, disassemble, and transport suspended or ground-stacked CAF730s and SS730s. This preparation should be followed as standard procedure for all future uses. It results in everything being ready for transport or for assembling an array.

6.6.1 Fly-Bar

There is no special preparation for the CAF730 Fly-Bar.

6.6.2 CAF730

Install three of the supplied Quick Release Pins in each of the two rear Hinge Tubes with their handle ends inwards. Always insert one in the top hole of each Hinge Tube passing through the top hole of its Hinge. This will lock each hinge in its retracted position. The Quick Release Pins should always be re-installed in these locations as the loudspeakers are un-rigged. The purpose for this is that, when rigging, the Quick Release Pins are available where needed to attach another enclosure.

6.6.3CAF730 Face Pallet

To place two CAF730s on their Pallet, lift each enclosure with its top side towards you and the front facing the floor. Place it face down on the pallet so the enclosure's top is towards the outside of the pallet. Ensure the front hinges are fully retracted so the enclosure front rests flat on the pallet platform. When the Pallet is loaded correctly, the bottom sides of the two enclosures should be facing each other.

6.6.4 SS730

Install the four supplied Quick Release Pins with their handle ends inwards in the top hole of each of the four Hinge Tubes passing through the top hole of its Hinge. This will lock each hinge in its retracted position. The Quick Release Pins should always be re-installed in these locations as the loudspeakers are un-rigged. The purpose for this is that, when rigging, the Quick Release Pins are available where needed to attach another enclosure.

6.6.5 SS730 Pallet

Place one SS730 or a stack two SS730 enclosures on the pallet oriented right side up. If placing two SS730s on a Pallet, lock the enclosures together by sliding the Hinges from the lower enclosure up into the Hinge Tubes of the upper enclosures. Attach each Hinge to the upper enclosure's Hinge Tube using the Quick Release Pin from the lower enclosure.

6.7 SUSPENSION PROCEDURES

The basic procedure for suspending CAF730s and SS730s or a combination of both is similar. What varies is how different pallets affect handling of the enclosures when being suspended. In all cases, it is recommended that CAF730 enclosures be attached to an array one at a time. The SS730 enclosures may be attached two at a time.

IMPORTANT NOTE: *Always suspend all SS730s over the CAF730s.*

In all cases, reverse each procedure for unrigging the array.

DANGER: *Ensure each Quick Release Pin used in assembling an array is fully inserted and engaged. Use only the 1.5 inch Quick Release Pins supplied or equal. Quick Release Pins of different lengths or diameter will compromise the structural integrity of the enclosure and Fly-Bar rigging system and may result in damage to the equipment, injury, or death.*

CAUTION: *When attaching Hinges to Hinge Tubes, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired splay angle. Failure to follow this instruction can result in poor acoustical performance.*

CAUTION: *To help prevent personal injury, clear all pallets as soon as they are empty from the immediate work area.*

6.7.1 CAF730s On CAF730 Pallet

1. Move a CAF730 Pallet to the rigging location.
2. Lift a CAF730 enclosure off the pallet and lay it down, positioned so its hinges are on top and it is directly below the rigging point. The CAF730 may be laid on the floor or on a standard road case lid at a comfortable working height.

6.7.2 SS730s on SS730 Pallet

1. Move an SS730 Pallet to the rigging location.

6.7.3 Attaching a CAF730 or SS730 to the Fly-Bar

1. Lift the Fly-Bar onto the top of the CAF730 or SS730. Orient the Fly-Bar with its corner Hinge Tubes to the front of the loudspeakers.
2. Remove the four (SS730) or six (CAF730) Quick Release Pins from the top of the enclosure's Hinge Tubes.
3. Slide the enclosure's four Hinges up into the four Hinge Tubes on the Fly-Bar. For a CAF730, align hole 2 of the front Hinges and hole 3 of the rear Hinges with the upper hole in each Fly-Bar Hinge Tube. For an SS730, align hole 1 of each Hinge with the upper hole in each Fly-Bar Hinge Tube. The result will be the top of the enclosure being parallel to the plane of the Fly-Bar when suspended.
4. Attach the Hinges to the Hinge Tubes by inserting four of the Quick Release Pins. (removed in Step 2) through both. Use ONLY the upper hole in the Fly-Bar Hinge Tubes.
5. For a CAF730, insert the remaining two Pins (removed in step 2) into the enclosure's rear Hinge Tubes as locking pins. See "Locking Pins" Section 6.4.5.
6. Attach the chain motors or other lifting device to the Fly-Bar, using one of the methods detailed under "Fly-Bar Rigging Recommendations" Section 6.3.
7. Lift the array to the working height needed for the next applicable procedure in the following sections.

6.7.4 Attaching SS730s to SS730s Already Suspended

NOTE: *SS730s should always be flown tight-packed to each other.*

1. Move an SS730 Pallet so its SS730 is positi oned under the bottom SS730 of the array.
2. Remove the four Quick Release Pins from the Hinges of the SS730 on the pallet.
3. Lower the array until the bottom SS730 barely touches the SS730 on the Pallet.
4. Slide the four Hinges of the SS730 on the pallet into the suspended SS730's Hinge Tubes. Align Hole 2 of each Hinge with the Hinge Tube Hole.
5. Attach the Hinges to the Hinge Tubes by inserting a Quick Release Pin (removed in Step 2) through both. The result will be tight-packed SS730s.
6. Repeat Steps 1 to 5 for additional SS730s.

6.7.5 Attaching a CAF730 to an SS730 Already Suspended

CAUTION: *When attaching Hinges to Hinge Tubes in steps 6 and 9, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired splay angle. Failure to follow this instruction can result in poor acoustical performance.*

1. Move a Pallet with the CAF730 to be attached to the rigging location.
2. Lift the CAF730 enclosure off the pallet and lay it down, positioned so its hinges are on top and the enclosure is directly below the array. The CAF730 may be laid on the floor or on a standard road case lid at a comfortable working height.
3. Remove the six Quick Release Pins from the rear Hinges of the CAF730.
4. Lower the array until the bottom SS730 barely touches the front of the CAF730.
5. Slide the two front Hinges of the CAF730 into the suspended SS730's front Hinge Tubes.
6. Attach the Hinges to the Hinge Tubes by inserting a Quick Release Pin (removed in Step 2) through both.
7. Employing two people, one lifts the rear of the CAF730, rotating it on the attached front Hinges.
8. The second person slides the two rear Hinges of the CAF730 into the rear Hinge Tubes of the suspended SS730.

NOTE: *It will usually be necessary to nudge the CAF730 enclosure being attached backwards to line up its Hinges with the Hinge Tubes on the SS730.*

9. Attach the Hinges to the Hinge Tubes by inserting a Quick Release Pin (removed in step 8) through both.
10. Insert each a Quick Release Pin (removed in step 2) into each of the enclosure's rear Hinge Tubes as a locking pin. See "Locking Pins" Section 6.4.5.

6.7.6 Attaching CAF730s to CAF730s Already Suspended

CAUTION: *When attaching Hinges to Hinge Tubes in steps 5 and 10, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired splay angle. Failure to follow this instruction can result in poor acoustical performance.*

1. Move a CAF730 Pallet so the top rear Hinges of a CAF730 are below the rear Hinge Tubes of the bottom CAF730 in the array.
2. Remove the six Quick Release Pins from the rear of the CAF730 on the pallet.
3. Lower the array until the rear Hinge Tubes of the bottom suspended CAF730 are even with the top of the rear Hinge Tubes of the CAF730 on the pallet.
4. Extend and slide the Hinges of the CAF730 on the pallet into the suspended CAF730's Hinge Tubes.

NOTE: *Bump the array slightly as needed to line up the enclosures so the Hinges slide easily into the Hinge Tubes.*

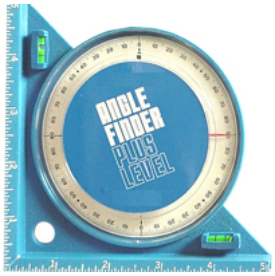
5. Attach each Hinge to the Hinge Tube by inserting a Quick Release Pin (removed in Step 2) through both.
6. Insert a Quick Release Pin (removed in step 2) into each of the enclosure's rear Hinge Tubes as a locking pin. See "Locking Pins" Section 6.4.5.
7. Lift the Array, with the CAF730 attached only by its rear Hinges, to a comfortable working height for the next step.
8. Employing two people, one lifts the front of the CAF730, rotating it on the attached rear Hinges.
9. The second person slides the CAF730's front Hinges into the suspended CAF730's Hinge Tubes.

CAUTION: *When attaching the front Hinges, the normal configuration is tight packing the enclosure fronts unless otherwise configured by the Wizard.*

NOTE: *It will usually be necessary to nudge the CAF730 enclosure being attached backwards to line up its Hinges with the Hinge Tubes on the suspended enclosure above.*

10. Attach each Hinge to the Hinge Tube by inserting a Quick Release Pin (removed in step 7) through both.
11. Repeat Steps 1 to 10 for additional CAF730s.

6.7.7 Setting the Tilt Angle for the Entire Array



Normally, the easiest method is to use a clinometer, such as a simple, bubble-type angle finder (pictured). More sophisticated, albeit more expensive, electronic clinometers can also be used.

Place the angle finder against one of the rigging tubes on the face of the uppermost enclosure in the array that can be physically reached. Adjust the angle of the entire array so that the face of this enclosure is set at its prescribed aiming angle listed in theCAF730 Wizard on the*Array Tab*.

6.8 GROUND STACKING PROCEDURES

Up to six CAF730s and up to four SS730s may be ground-stacked. Always stack CAF730s using the SS730(s) or the CAF730 Fly-Bar as a base for the stack.

DANGER: *A ground stack of more than six CAF730 enclosures may shift the center of gravity making the stack unstable. Failure to follow this warning may result in damage to the equipment damage, injury, or death.*

6.8.1 Stacking With SS730(s) as the Base

IMPORTANT NOTE: *If using one or more SS730s as the stacking base, all CAF730 and SS730 enclosures are stacked right side up. Always stack all SS730s underneath the CAF730s.*

1. At the desired stacking location, position an SS730 on the floor with the Hinges on the top, this being the normal orientation for suspension.

6.8.2 Stacking Additional Enclosures (SS730 as the base)

CAUTION: *When attaching Hinges to Hinge Tubes in step 5 for an SS730, position the SS730 so it lies flat on the SS730 below it. In step 5 for a CAF730, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired splay angle. Failure to follow this instruction can result in poor acoustical performance.*

1. Lift an SS730 or CAF730 from its pallet and orient it so the Hinges on the enclosure are on the top, this being the normal orientation for suspension.
2. Lift the enclosure onto the stack mating the alignment pads and recesses between them.
3. Remove the four (SS730) or six (CAF730) Quick Release Pins from the Hinges of the lower enclosure.
4. Slide the four lower enclosure Hinges up into the Hinge Tubes on the enclosure above it.
5. Attach each Hinge to the Hinge Tube by inserting a Quick Release Pin (removed in Step 4) through both.
6. For a CAF730, use its handles to lift the rear of the enclosure as high as possible and insert a Quick Release Pin (removed in step 3) into each of the enclosure's rear Hinge Tubes as a locking pin. See "Locking Pins" Section 6.4.5.
7. Repeat steps 1 to 6 for additional enclosures.

6.8.3 Stacking With the Fly-Bar as the Base

IMPORTANT NOTE: *If using the Fly-Bar as the base, all CAF730 and SS730 enclosures are stacked upside down.*

1. At the desired stacking location, position the CAF730 Fly-Bar on the floor so it is resting on its leveling feet. This will be upside down from its normal orientation for suspension, oriented with the corner hinge Tubes towards the audience.
2. Adjust the leveling feet on the Fly-Bar so the Fly-Bar sits level or at the desired angle. Firmly tighten the nut on each leveling foot against the Fly-Bar pad. Firmly tighten the second "jam" nut against the first to lock both nuts.

6.8.4 Stacking the First Enclosure (Fly-Bar as the base)

CAUTION: *When attaching Hinges to Hinge Tubes in step 4 for an SS730, position the SS730 so it lies flat on the CAF730 Fly-Bar. In step 4 for a CAF730, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired aiming angle. Failure to follow this instruction can result in poor acoustical performance.*

1. Lift an SS730 or CAF730 from its pallet and turn it upside down, so the Hinges on the enclosure are on the bottom. Position it onto the Fly-Bar so its Hinges line up the Fly-Bar Hinge Tubes.
2. Remove the four (SS730) or six (CAF730) Quick Release Pins from the Hinges.
3. If they do not drop from gravity, slide the four Hinges of the enclosure down into the Hinge Tubes on the Fly-Bar.
4. Attach each Hinge to the Hinge Tube by inserting a Quick Release Pin (removed in Step 2). Use what is now the upper hole on the Fly-Bar Hinge Tube.
5. For a CAF730, use its handles to lift the rear of the enclosure as far as possible and insert a Quick Release Pin (removed in step 2) into each of the enclosure's rear Hinge Tubes as a locking pin. See "Locking Pins" Section 6.4.5.

6.8.5 Stacking Additional Enclosures (Fly-Bar as the base)

CAUTION: *When attaching Hinges to Hinge Tubes in step 5 for an SS730, position the SS730 so it lies flat on the SS730 below it. In step 5 for a CAF730, use the correct holes as determined by the CAF730 Wizard or by the user-desired angles to achieve the desired splay angle. Failure to follow this instruction can result in poor acoustical performance.*

1. Lift an SS730 or CAF730 from its pallet and turn it upside down, so the Hinges on the enclosure are on the bottom.
2. Lift the enclosure onto the stack mating the alignment pads and recesses between them.
3. Remove the four Quick Release Pins from the Hinges of the upper enclosure.
4. If they do not drop from gravity, slide the four Hinges on the upper enclosure down into the Hinge Tubes on the enclosure below it.
5. Attach each Hinge to the Hinge Tube by inserting a Quick Release Pin (removed in Step 9) through both.
6. For a CAF730, use its handles to lift the rear of the enclosure as far as possible and insert a Quick Release Pin (removed in step 2) into each of the enclosure's rear Hinge Tubes as a locking pin. See "Locking Pins" Section 6.4.5.
7. Repeat steps 1 to 6 for additional enclosures.

7. CONTACTING woodworxmax

We have tried to answer any questions you may have about the CAF730 and SS730 in this manual and in the CAF730 Wizard Help file. Should you need further assistance, please do not hesitate to contact us. You can contact us in several different ways.

8. SERVICE AND MAINTENANCE

8.1 GENERAL SERVICE

For any faults that cannot be field-repaired as noted below, contact the woodworxmax Service Department listed in Chapter 7 to determine the appropriate action. This applies to both warranty and non-warranty faults.

8.2 RIGGING SERVICE

Because of the potential, serious consequences and liabilities due to faulty rigging, contact woodworxmax to determine the appropriate service solution for any rigging hardware problems.

8.3 BASIC FIELD TROUBLESHOOTING

Each CAF730 and SS730 loudspeaker has an input panel, internal components and wiring, transducers, and an enclosure. Troubleshooting for various performance problems usually involves isolating the problem to one of these areas:

1. Transducers
2. Input panel, internal components, and wiring
3. Enclosure and integral hardware

If no problems can be traced to any of these items, look for problems with external electronics or cabling. Troubleshooting these items is beyond the scope of this manual.

8.3.1 Transducers

A faulty transducer will usually cause readily audible distortions or other unwanted noises. In other cases, they may stop functioning. Use your ears and test signals or other sound source to determine which one is at fault. Normally a faulty transducer requires service or replacement by woodworxmax.

8.3.2 Input panel, Internal Components and Wiring

Faults with these items will usually cause transducers to stop working or possibly be intermittent. Check that audio signals pass from the input jacks to the transducer terminals. Many faults with this area can be field-repaired.

8.3.3 Enclosures

Enclosure problems, such as loose hardware, faulty joints, or other structural problems, will usually be heard as distinct buzzes, rattles, or other unwanted noises. To test for enclosure problems, use a sine wave signal manually swept on the LF sub-system. The input level should be no more than 6 dB below rated power (equals no more than 1/2 rated voltage). It may be possible to field-repair some enclosure problems.

8.4 INSPECTION

8.4.1 In-Use Inspection

Visually inspect all rigging parts and enclosures each time they are used for wear, deformation, cracks, corrosion, damage, and any other condition that may affect load handling capability.

DANGER: *If there is any question about the integrity or capability of any rigging part to perform its intended function, immediately remove it from service for repair or replacement.*

8.4.2 Periodic Inspection

Perform complete and thorough inspections on a routine, periodic basis. The interval between inspections and scope of the inspections will depend on the frequency of system usage and the conditions of use. This interval must not exceed 1 year.

DANGER: *Should any of the below listed types of damage exist, immediately remove the affected part from service for repair or replacement.*

8.4.3 Complete Inspection

A complete inspection should include, but not be limited to, looking for the types of damage or failures listed in each group:

8.4.4 Rigging Components

1. Bends
2. Breaks
3. Broken parts
4. Corrosion
5. Cracks
6. Cracks in welded joints
7. Deformation
8. Denting
9. Wear
10. Loose parts or fasteners
11. Missing parts or fasteners
12. Binding Hinges, Hinge joints or Hinge Tubes

8.4.5 Loudspeaker Enclosures

1. Cracks or breaks in the wood
2. Cracks or bends in the covers

8.4.6 Fly-Bar

1. Bends
2. Cracks
3. Cracked welds
4. Worn spots

8.4.7 Connecting Pins

1. Out-of-roundness
2. Plunger binding or other improper operation
3. Loss of plunger spring action
4. Missing ball bearings

8.4.8 Caster Pallets

1. Cracks or breaks in the wood
2. Bent wheels
3. Wheels that bind when swiveled or rolled
4. Damaged tires

8.5 MAINTENANCE

8.5.1 Performance Testing

Listening tests and/or formal measurements should be done periodically. The interval between such tests will depend on the frequency of system usage and the conditions of use. All transducers should be tested for functionality and proper performance. A sine wave sweep at approximately 10% of rated power will usually reveal transducer and/or enclosure problems in the form of distortion, buzzes, or rattles.

8.5.2 Cleaning

Clean the exterior surfaces of the enclosures as required, using a damp cloth to remove any dust or dirt. After cleaning, use a clean dry cloth to remove any excess moisture.

CAUTION: *To avoid damaging the exterior finishes do not use cleaning solvents or abrasives.*

8.5.3 Cosmetic Field Repairs

While the enclosure paint finish and wood is of high quality and durability, mars, marks, and other blemishes will likely appear from normal use. For paint touchup, contact the woodworxmax Service Department for original factory paint (Sherwin-Williams Polane® 700T, water reducible polyurethane-acrylic enamel) and instructions for its application. Otherwise, use the closest match to this paint from a local Sherwin-Williams dealer. For cosmetically damaged wood, use common woodworking methods and materials as appropriate for the damage.